

12/06/09

(273) ① (cont)

b) $x \sim B(1000; 0.02)$ Calcular

$$P(x > 30) \text{ y } P(x < 80)$$

$$n = 1000; p = 0.02; q = 0.98$$

$$n \cdot p = 20 \quad n \cdot q = 980; \sqrt{n \cdot p \cdot q} = 4.43$$

$$B(1000; 0.02) \underset{x}{\approx} N(\underset{x'}{20}, 4.43)$$

$$P(x > 30) = P(x' > 30.5) = P\left(z \geq \frac{30.5 - 20}{4.43}\right)$$

$$= P(z \geq 2.37) = 1 - P(z < 2.37) = 1 - 0.9911 = 0.0089$$

$$P(x < 80) = P(x' \leq 79.5) = P\left(z \leq \frac{79.5 - 20}{4.43}\right)$$

$$= P(z \leq 13.43) = 1$$

c) x es $B(50, 0.9)$ Calcula

$$P(x > 45) \text{ y } P(x \leq 30)$$

$$np = 45; \quad nq = 50 \cdot 0.1 = 5; \quad \sqrt{npq} = 2.12$$

$$B(50, 0.9) \approx N(45, 2.12)$$

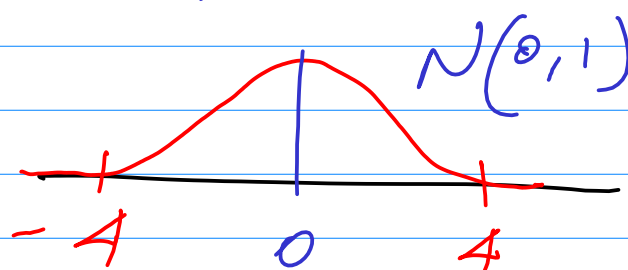
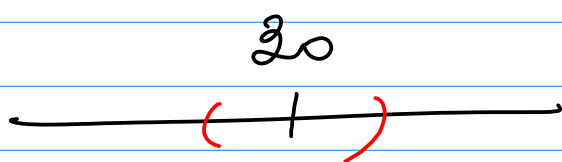
$$P(x > 45) = P(x \geq 45.5) = P\left(z \geq \frac{45.5 - 45}{2.12}\right)$$

$$= P(z \geq 0.236) = 1 - P(z \leq 0.236) = 1 - 0.5948 =$$

$$= 0.4052$$

$$P(x \leq 30) = P(x \leq 29.5) = P\left(z \leq \frac{29.5 - 45}{2.12}\right)$$

$$= P(z \leq -7.21) = 0$$



15/06/09

(279) 15° Si lanzamos un dado 1000 veces, ¿cuál es la probabilidad de que el número de cinco sea menor que 100?

$$B(1500, \frac{1}{6}) \approx N\left(\frac{1500}{6}, \sqrt{1500 \cdot \frac{1}{6} \cdot \frac{5}{6}}\right) =$$

$$B(n, p) \approx N(np, \sqrt{npq})$$

$$= N(166'67, 11'79)$$

$$P(X < 150) = P(X' \leq 99'5) =$$

$$\begin{array}{c} \text{--- (1) ---} \\ 150 \end{array}$$

$$= P\left(Z \leq \frac{99'5 - 166'67}{11'79}\right) = P(Z \leq -5'79) = 0$$

Indas:

$$P(X=150) = \binom{1500}{150} \left(\frac{1}{6}\right)^{150} \cdot \left(\frac{5}{6}\right)^{950}$$

$$\begin{array}{c} 99'5 \quad 100'5 \\ \text{--- (1) ---} \\ 150 \end{array}$$

$$P(X=150) = P(99'5 < X' < 100'5) =$$

$$= P\left(\frac{99'5 - 166'67}{11'79} < Z < \frac{100'5 - 166'67}{11'79}\right) =$$

$$= P(-5'70 < Z < -5'61) = 0 - 0 = 0$$

$$(271) \quad (7^\circ) \quad f) \quad P(x=174) = 0$$

(279) (16°) Una moneda se lanza 400 veces. Calcula la probabilidad de que el número de caras

a) Sea mayor de 200

b) Esté entre 180 y 220

$$n = 400; \quad p = \frac{1}{2} = 0.5; \quad q = 0.5; \quad np = 200$$

$$nq = 200$$

$$B(400, 0.5) \approx N(200, 10)$$

$$\sqrt{npq} =$$

$$a) \quad P(x > 200) = P(x' \geq 200.5) = P\left(z \geq \frac{200.5 - 200}{10}\right)$$

$$\begin{array}{c} \text{---|---} \\ \text{200} \end{array} \quad = P(z \geq 0.05) = 1 - P(z < 0.05)$$

$$= 1 - 0.5199 = 0.4801$$

$$b) \quad P(180 \leq x \leq 220) = P(179.5 \leq x' \leq 220.5)$$

$$\begin{array}{c} \text{---|---} \\ \text{(1) (1)} \\ \text{180 220} \end{array}$$

$$= P\left(\frac{179.5 - 200}{10} \leq z \leq \frac{220.5 - 200}{10}\right) =$$

$$= P(-2.05 \leq Z \leq 2.05) =$$

$$= 2P(Z \leq 2.05) - 1 = 2 \cdot 0.9798 - 1 =$$

$$= 0.9596$$